TMDLs for Lower Lost River, California
September 2006

What is the water quality problem in Lower Lost River? Water quality in the Lower Lost River is impaired because there are excessively high nutrient and pH levels in the water, which results in insufficient dissolved oxygen (DO) levels to support healthy fish habitat and prevent fish kills. California identified the Lower Lost River as "impaired" due to high pH and nutrients. The State of Oregon identified similar impairments in the Lost River in Oregon; however, Oregon plans to adopt TMDLs for the Lost River in conjunction with TMDLs for the Klamath River in 2007. The Lower Lost River, as discussed here, refers to water bodies within this California watershed, including: Lower Lost River channel from the Oregon border to Tule Lake, Tule Lake, Lower Klamath Lake/Refuge, and Klamath Straits Drain.

Our analysis of water quality data and water quality modeling results indicate the low DO levels are caused by two main factors:

- ► plant nutrients (especially nitrogen), which cause excessive growth of algae and other aquatic plants and in turn cause large reductions in River DO levels, and
- ► organic material that consumes DO from the water as it decomposes.

Excessive nutrient and organic matter appears to be coming from return flow and diversion discharges into the River.

What is a TMDL? Total maximum daily loads, or TMDLs, refer to a water quality planning process required under the federal Clean Water Act. TMDLs are developed for polluted waters identified by States. A TMDL identifies the pollutant reductions needed to meet state water quality goals, known as "objectives" in California. A TMDL study evaluates pollutants causing water quality problems, assesses local sources of these pollutants, and identifies the maximum pollutant loadings a water body can receive from different sources while still protecting its uses. In the case of the Lost River, protection of fish habitat is the key water body use of concern in the TMDLs.

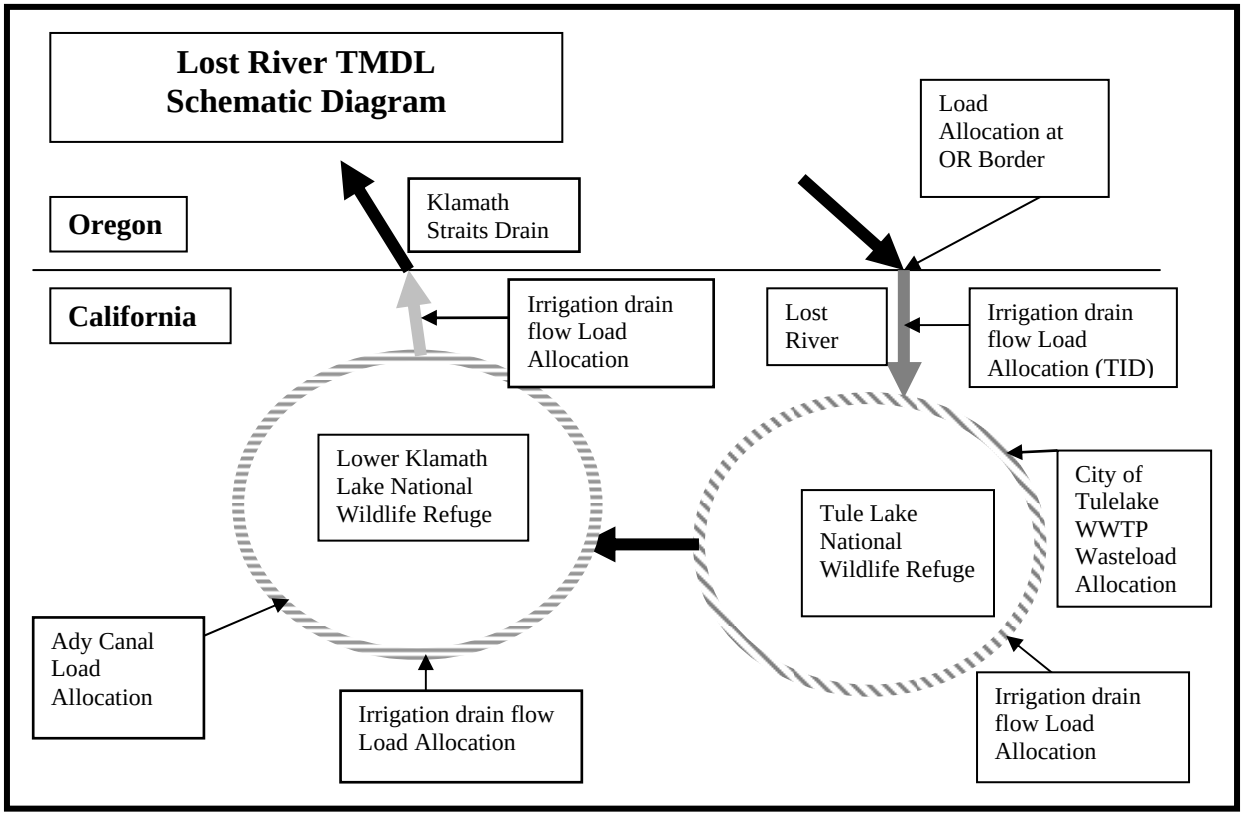
Why is EPA establishing the TMDLs in California? In 1992, the State of California and the U.S. Environmental Protection Agency (EPA) identified the Lower Lost River as an impaired water body. Under the terms of a court ordered schedule for completing TMDLs for rivers in northwest California (*Pacific Federation of Fishermen's Association v.* EPA, 1997), the TMDLs for Lower Lost River must be completed by the end of 2006. In California, TMDLs are usually developed and adopted by the Regional Water Quality Control Boards (Regional Boards), approved by State Water Resources Control Board, and approved by U.S. EPA. Although the North Coast Regional Board has worked with EPA to develop the Lost River TMDLs, the state cannot complete the TMDLs in time to meet a court-ordered schedule. EPA will therefore establish the TMDLs by 2007. California intends to later adopt the TMDL along with a detailed plan of implementation that will specify actions to be taken to address nutrient reductions needed to meet the TMDLs. The State of Oregon plans to develop Lost River TMDLs for the portion of the River in Oregon in 2007.

Want More Information? To be added to the California Lower Lost River TMDL mailing list, please contact Gail Louis, US EPA Region 9, 75 Hawthorne Street (WTR-3), San Francisco, CA 94105. Phone: 415-972-3467, Email: louis.gail@epa.gov

What will EPA propose?

Based on our analysis of the causes of low dissolved oxygen in the Lost River, EPA will be establishing TMDLs for nitrogen and biochemical oxygen demand (BOD, or organic matter). EPA plans to identify total allowable loads for the following 4 segments of the Lower Lost River in California:

1. Lost River from the Oregon border to Tule Lake,
2. Tule Lake,
3. Lower Klamath Lake/Refuge, and
4. Klamath Straits Drain



Our modeling analysis indicates that dissolved inorganic nitrogen (DIN) and carbonaceous BOD (C-BOD) need to be reduced by approximately 50% from 1999 levels in order to meet California numeric water quality objectives for DO, pH and narrative objectives for nutrients. The TMDLs and allocations will reflect the needed reduction levels and be expressed in terms of annual and average daily mass loads of DIN and C-BOD. The TMDLs and allocations will apply year round and include an implicit margin of safety (as required by the Clean Water Act) to account for analysis uncertainties.

The TMDLs will identify load allocations for nonpoint sources of nutrient and BOD to these segments, including allocations at the Oregon border, to Ady Canal at Lower Klamath Lake, and general load allocations to other nonpoint sources. Sufficient information was unavailable to EPA to support more specific load allocations at this time. A wasteload allocation will be provided to the City of Tulelake sewage treatment plant, for its point source discharge to a tributary of Tule Lake.

Proposed Lost River TMDLs and Allocations

Segment/Source	DINAllocations & TMDLs (mtons/yr)	DIN Allocations & TMDLs (average kg/day)	CBOD Allocations & TMDLs (mt/yr)	CBOD Allocation & TMDLs (avg. kg/day)
1. Lost River at Stateline Road (OR Border) Load Allocation	27.4	75.0	53.8	147.4
1. Load Allocation for irrigation drainage loads to Lost River between Stateline Rd and Tule Lake (to Tule Lake ID)	1.0	2.7	17.5	47.9
1. Wasteload Allocation-CalTrans	0.1	0.3	0.2	0.5
1. Lost River (border to Tule Lake) TMDL	28.5	78.1	71.5	195.9
2. Background load-Lost River	28.5	78.1	71.5	204.3
2. Load Allocation for irrigation drainage loads to Tule Lake (to Tule Lake ID)	34.9	95.7	249.8	684.4
2. Wasteload Allocation-CalTrans	0.1	0.3	0.2	0.5
2. Wasteload Allocation City of Tulelake WWTP	2	5.2	7	19.2
2. Tule Lake TMDL	65.5	179.3	328.5	900.0
3. Background load- Tule Lake	19.5	53.4	246.0	674.0
3. Load Allocation for irrigation drainage loads to Lower Klamath Lake (to USFWS)	4.2	11.5	39.4	107.9
3. Load Allocation- Ady Canal (to USBOR)	4.2	11.5	39.4	107.9
3. Wasteload Allocation-CalTrans	0.1	0.3	0.2	0.5
3. Lower Klamath Lake/ Refuge TMDL	28.0	76.7	325.0	890.4
4. Background load from Lower Klamath Lake	20	54.8	193.5	530.1
4. Load Allocation for irrigation drainage loads to Klamath Straits Drain* (to USBOR)	1.4	3.8	21.0	57.5
4. Klamath Straits Drain TMDL (LKL- border)	21.4	58.6	214.5	587.6

What will the TMDLs mean to local stakeholders? Under State law, when California adopts a TMDL, it must also describe the responsibilities of different organizations to implement pollution controls and conduct follow-up monitoring. To assist in California's implementation planning process, EPA is working with local stakeholders to identify and recommend reasonable measures to address nutrients and BOD in the Lost River. Measures to reduce nutrient and BOD loading from agricultural operations and associated return flows may be needed. It may also be feasible to address the DO and pH problems in part through restoration projects that improve the River's ability to process nutrient and BOD loads.

What comes next? EPA is meeting with local agencies, landowners, and stakeholder during Summer and Fall 2006 to discuss the TMDL and potential implementation approaches. We expect to release a draft TMDL for public review in November 2006 and establish the final TMDLs, with implementation recommendations, in early 2007.